Geo-Informatics and Space Technology Development Agency (Public Organization)

GISTDA

GNSS Education and Training Program in Thailand

By

Pirada TECHAVIJIT

Satellite Control Engineer

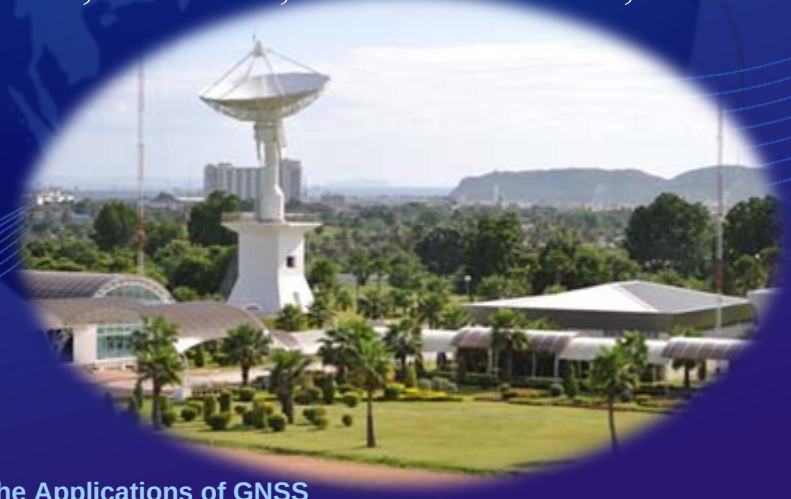
GISTDA (Geo-informatics and Space Technology Development Agency)

UN/UAE/USA Workshop on the Applications of GNSS
January 16-20, 2011, Dubai, United Arab Emirates

GISTDA (Geo-Informatics and Space Technology Development Agency)

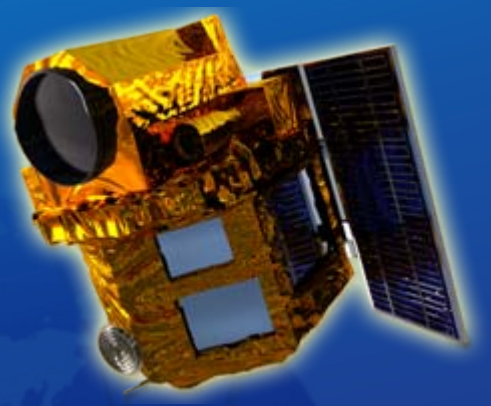
Experience:

- Participated in Earth observation program since early 1970s
- Established the Ground Receiving Station in 1981
- GISTDA was established in November 2000 as a public organization
- Many-year experienced in satellite data acquisition, processing, disseminating and application development of data from various sources
- Operating the Ground Station for example: Landsat, Radarsat, SPOT IKONOS, Quickbird.
- Fully Operating THEOS (Thailand Earth Observation Satellite)



THEOS Project

THEOS (Thailand Earth Observation Satellite) Project has been established through the cooperation agreement between the governments of Thailand and French Republic.



THEOS is the first earth observation satellite for Thailand which is Fully operated by GISTDA, Ministry of Science and Technology. THEOS was launched on 1st October 2008

THEOS Ground Station

GISTDA stations:

Head quarter

Chaengwattana, Bangkok

CGS (control ground station)

Siracha Chonburi

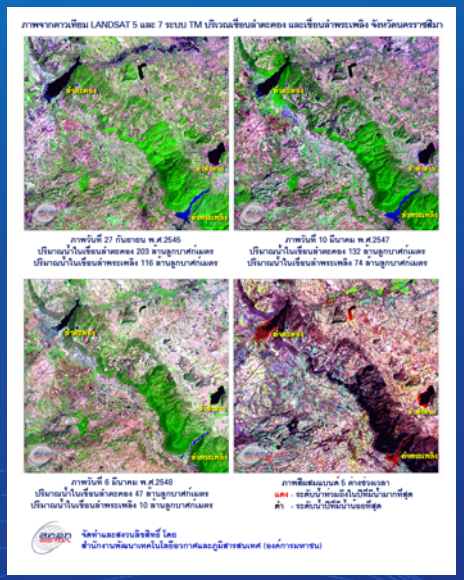
IGS (image ground station)

Ladkrabang, Bangkok:

Roles of GISTDA

Geo-Informatics and Space Technology Development Agency

Remote sensing and GIS



Space technology development

Question:

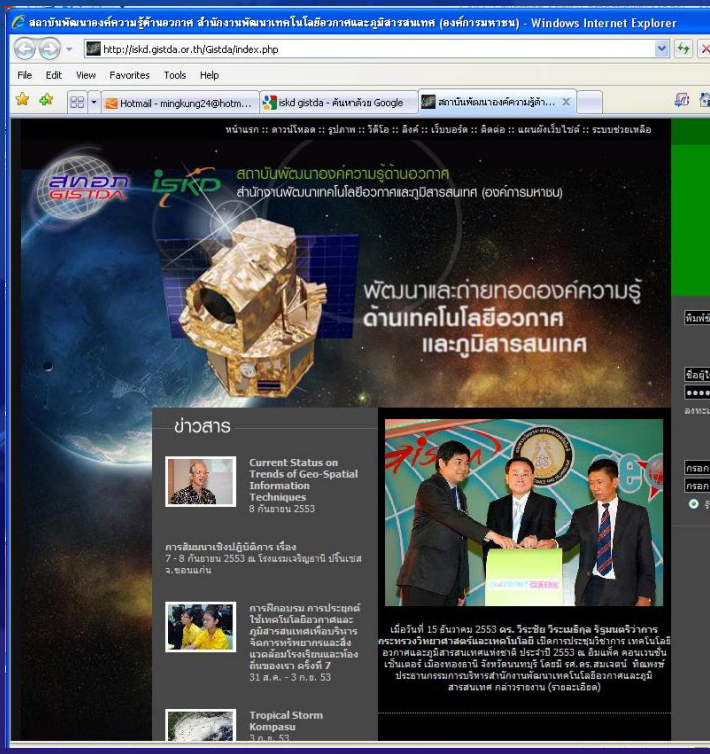
Is it sufficient?

Provide Satellite Imagery

Answer: Training & Education Program

Institute of Space Knowledge Development (ISKD)

- A center of knowledge-based and technology transfer in the area of space and geo-informatics
- Help end-users for applying the technologies to manage natural resources and environment.
- Enhance human capacity in the fields of remote sensing, GIS and GPS technologies.



ISKD's Training Courses

Courses example:

- GPS and GNSS Technology
- Introduction to Geographic Information System
- Microwave Remote Sensing
- Spatial Analysis in GIS
- Programming for GIS

Question:

Training at GISTDA Head Quarter:

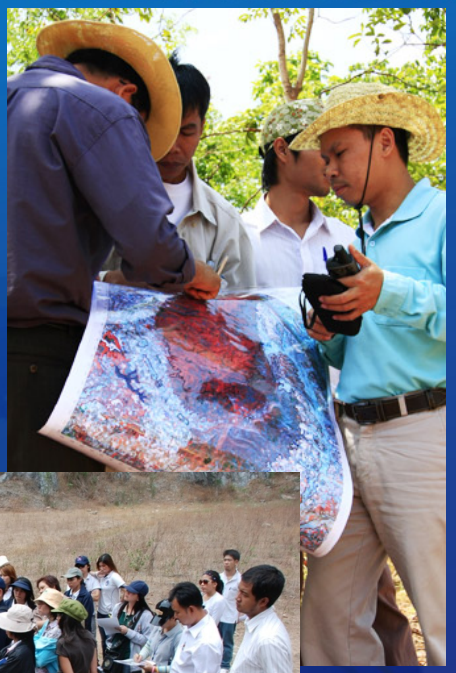
Is it sufficient?

GISTDA Regional Centers

5 universities were appointed as GISTDA's nodes:

- Chaing Mai University, Chaing mai
- Naresuan University, Pitsanulok
- Khonkaen University, Khonkaen
- Songkhla University, Songkhla
- Burapa University, Chonburi

Activities



Question:

Regional Centers:

Is it sufficient?

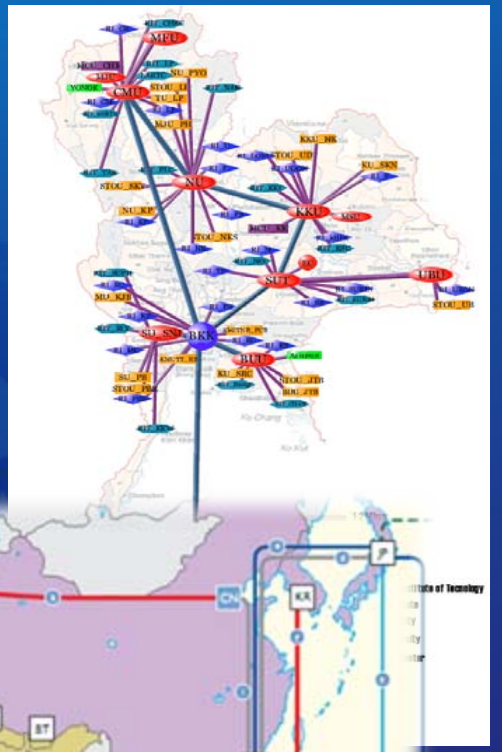
Project:

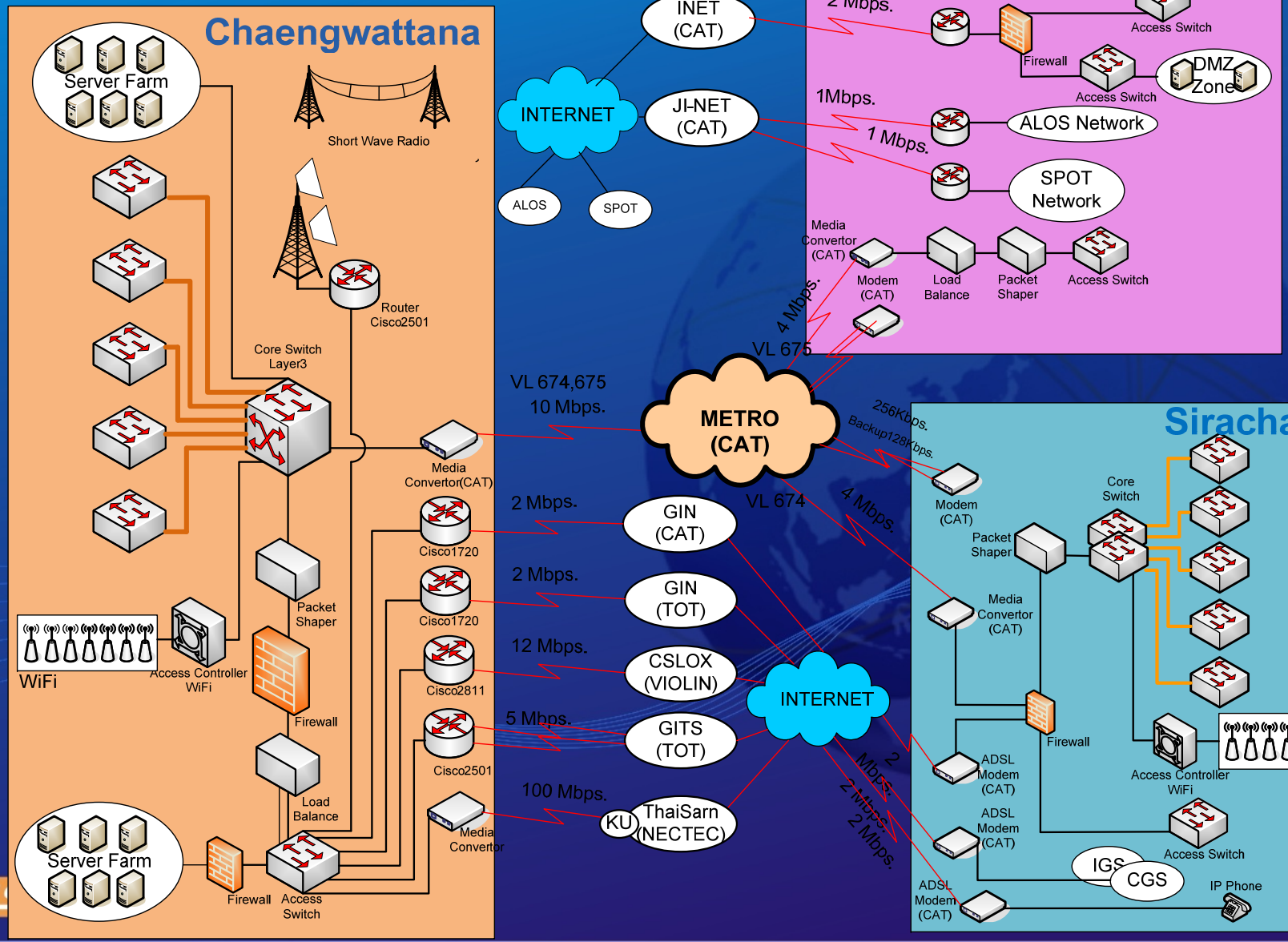
Planning for Network Between GISTDA and UniNet

- Providing interconnection between UniNet and Gistda for research and education: Training course, satellite imagery
- GISTDA signed an MoU with Uninet on 12th March 2010

UniNet

- UniNet (Inter University Network) has provided hi-speed information network linked to universities, institutes, and campuses more than 200 sites over the country.
- UniNet is then connected to TEIN3 (Trans-Eurasia Information Network)/ DANTE (Delivery of Advanced Network Technology to Europe

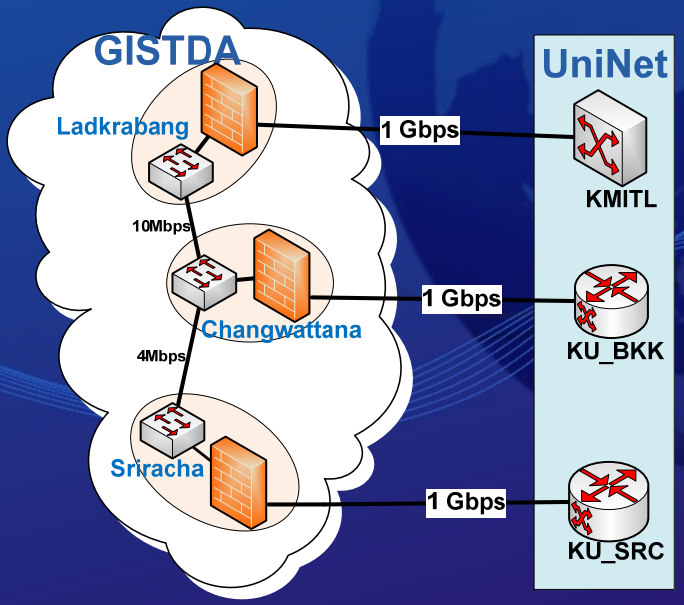



Chaengwattana
Server Farm
Short Wave Radio
Router Cisco2501
Core Switch Layer3
Media Convertor(CAT)
Cisco1720
Cisco1720
Cisco2811
Cisco2501
Packet Shaper
Access Controller WiFi
WiFi
Firewall
Load Balance
Server Farm
Firewall
Access Switch
Media Convertor
INET (CAT)
INTERNET
JI-NET (CAT)
ALOS
SPOT
VL 674,675
10 Mbps.
2 Mbps.
GIN (CAT)
2 Mbps.
GIN (TOT)
12 Mbps.
CSLOX (VIOLIN)
5 Mbps.
GITS (TOT)
100 Mbps.
KU
ThaiSarn (NECTEC)
METRO (CAT)
VL 675
4 Mbps.
VL 674
4 Mbps.
INTERNET
2 Mbps.
2 Mbps.
2 Mbps.
Ladkrabang
2 Mbps.
Router Cisco2501
Access Switch
Access Switch
Firewall
Access Switch
DMZ Zone
1Mbps.
ALOS Network
1 Mbps.
SPOT Network
Media Convertor (CAT)
Modem (CAT)
Load Balance
Packet Shaper
Access Switch
Siracha
256Kbps.
Backup128Kbps.
Modem (CAT)
Core Switch
Packet Shaper
Media Convertor (CAT)
Firewall
ADSL Modem (CAT)
Access Controller WiFi
ADSL Modem (CAT)
Access Switch
IGS
CGS
ADSL Modem (CAT)
IP Phone

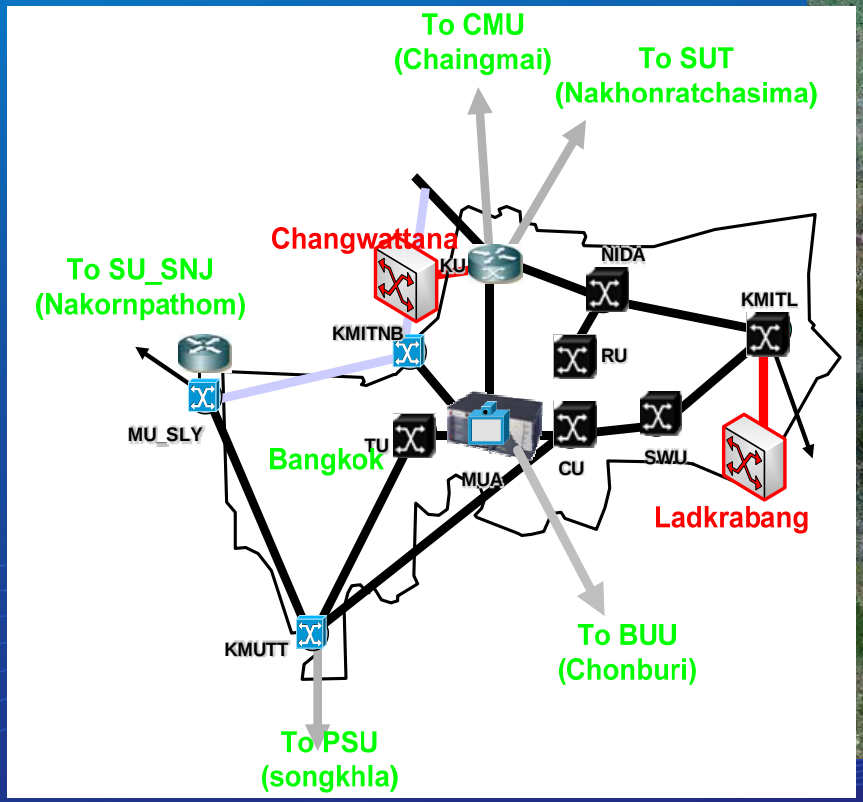
GISTDA and UniNet

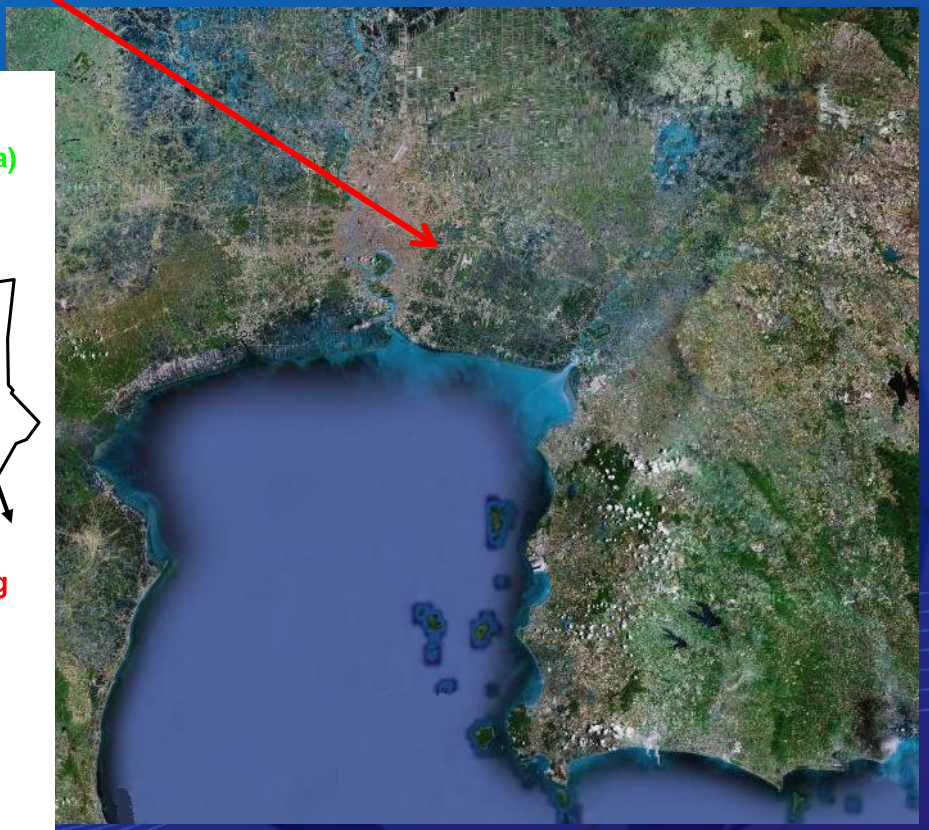
By considering shortest distance of each site connection, we found that:

- **Head quarter** can connect to KU (Kasetsart University main campus).
- **IGS** connect to KMITL (King Mongkut Institute of Technology Ladkrabang).
- **CGS** connect to KU_SRC campus (Kasetsart university Siracha campus)



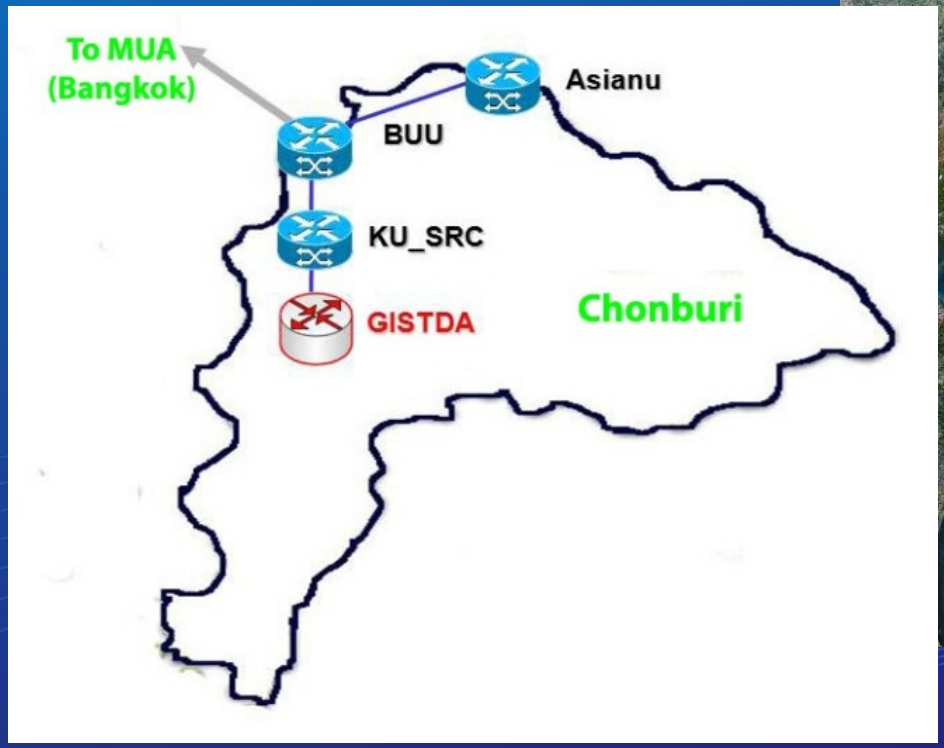
- *Image Ground Segment (IGS) Ladkrabang*
- *GISTDA Head Quarter*

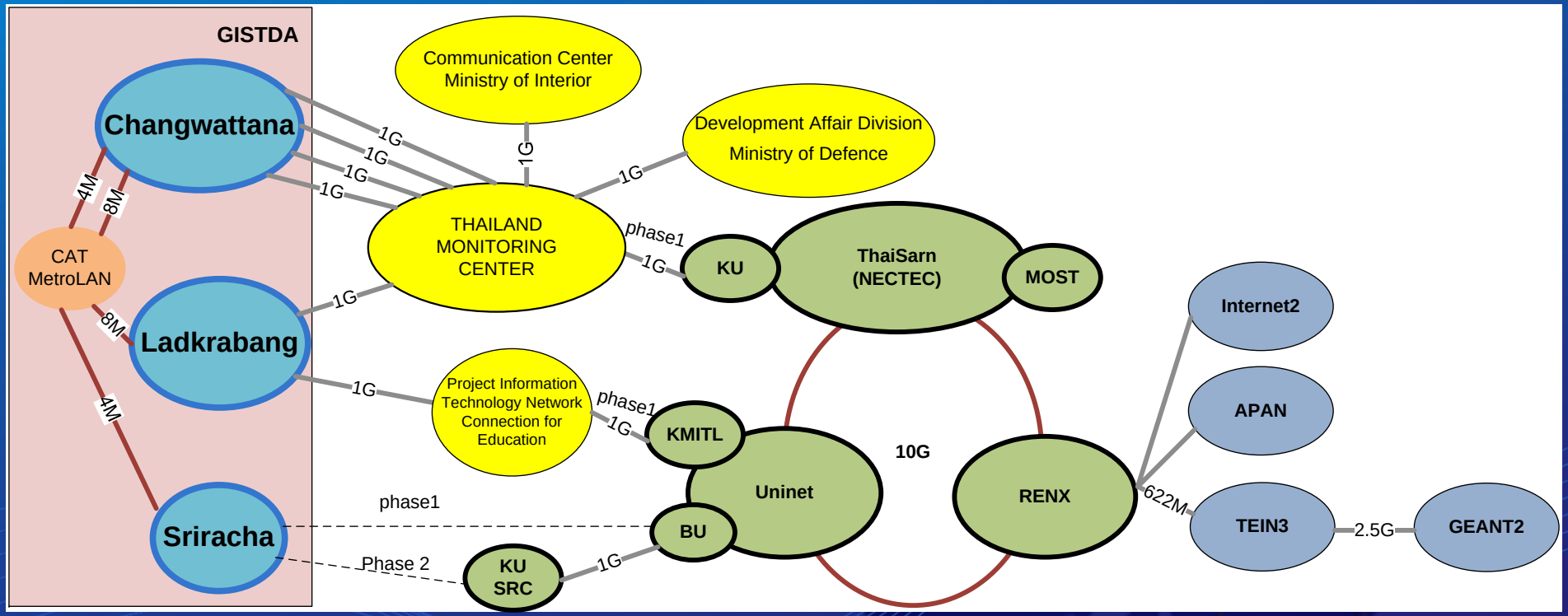




- ***THEOS Ground Station (CGS) Si-Racha :***

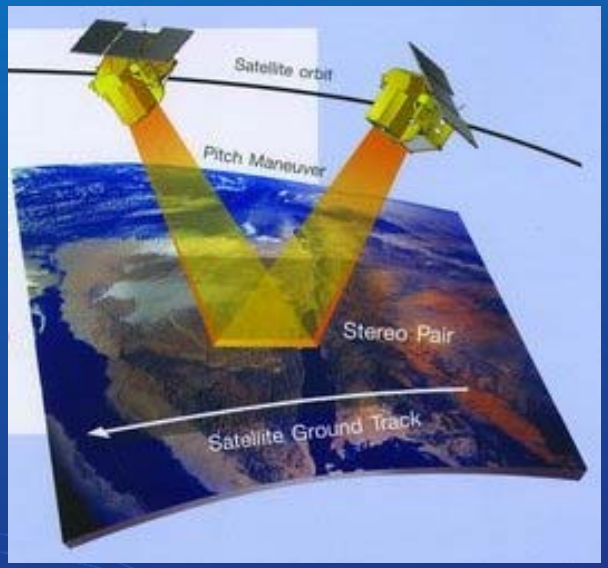
  To monitor and control the satellite according to the daily optimised mission programming by taking into account user requests and satellite utilisation.




GISTDA
Changwattana
CAT
MetroLAN
Ladkrabang
Sriracha
4M
8M
8M
4M
1G
1G
1G
1G
Communication Center
Ministry of Interior
1G
Development Affair Division
Ministry of Defence
1G
THAILAND
MONITORING
CENTER
1G
phase1
1G
KU
ThaiSarn
(NECTEC)
MOST
1G
Project Information
Technology Network
Connection for
Education
phase1
1G
KMITL
Uninet
10G
RENX
BU
phase1
Phase 2
KU
SRC
1G
622M
Internet2
APAN
TEIN3
2.5G
GEANT2

Question:

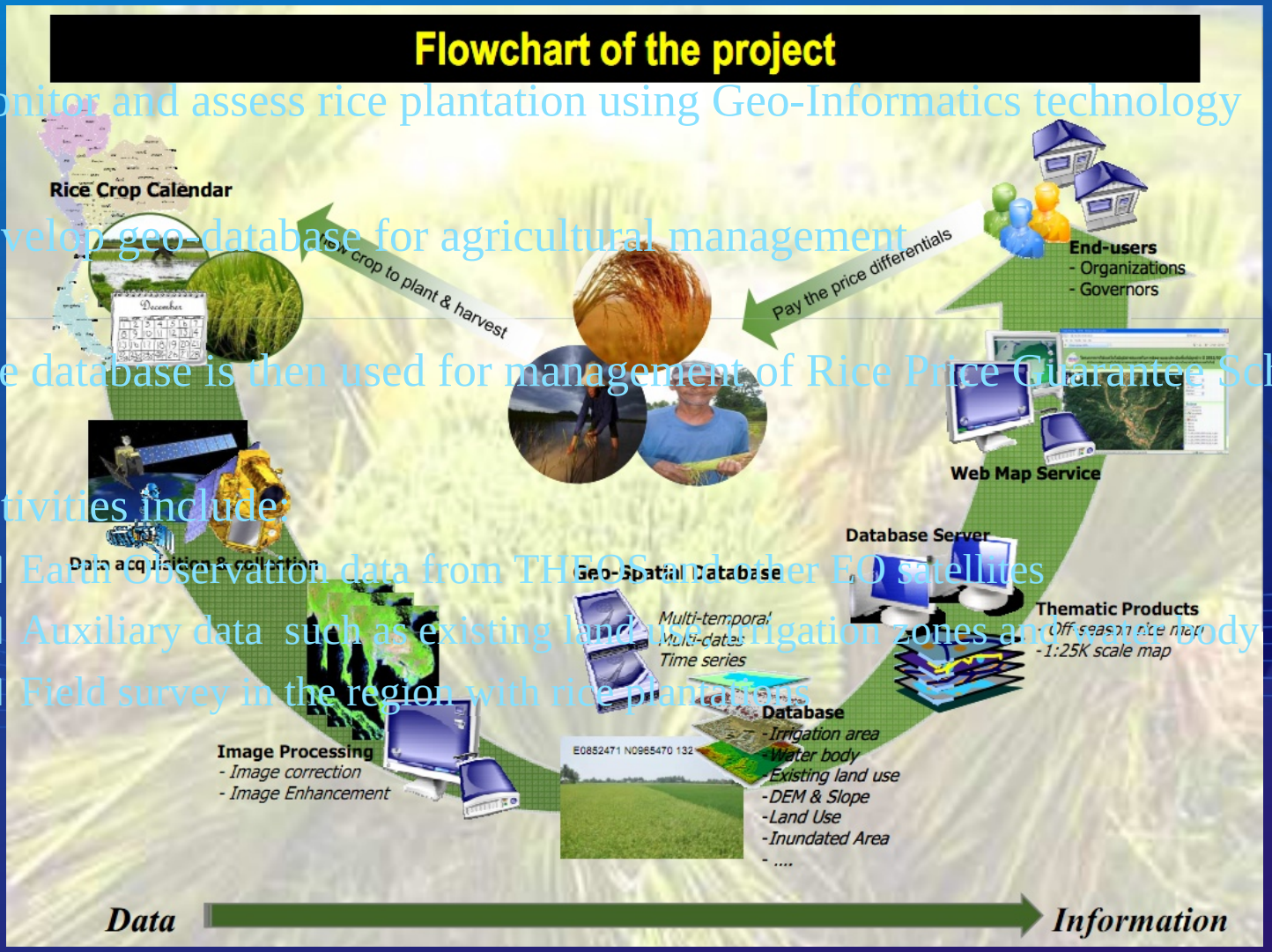
resource: THEOS + Training



How to use those tools?

Application of THEOS – Rice Price Guarantee Project

- Monitor and assess rice plantation using Geo-Informatics technology
- Develop geo-database for agricultural management
- The database is then used for management of Rice Price Guarantee Scheme
- Activities include:
  - Earth Observation data from THEOS and other EO satellites
  - Auxiliary data such as existing land use, irrigation zones and water body
  - Field survey in the region with rice plantations



Application of THEOS – Rice Price Guarantee Project

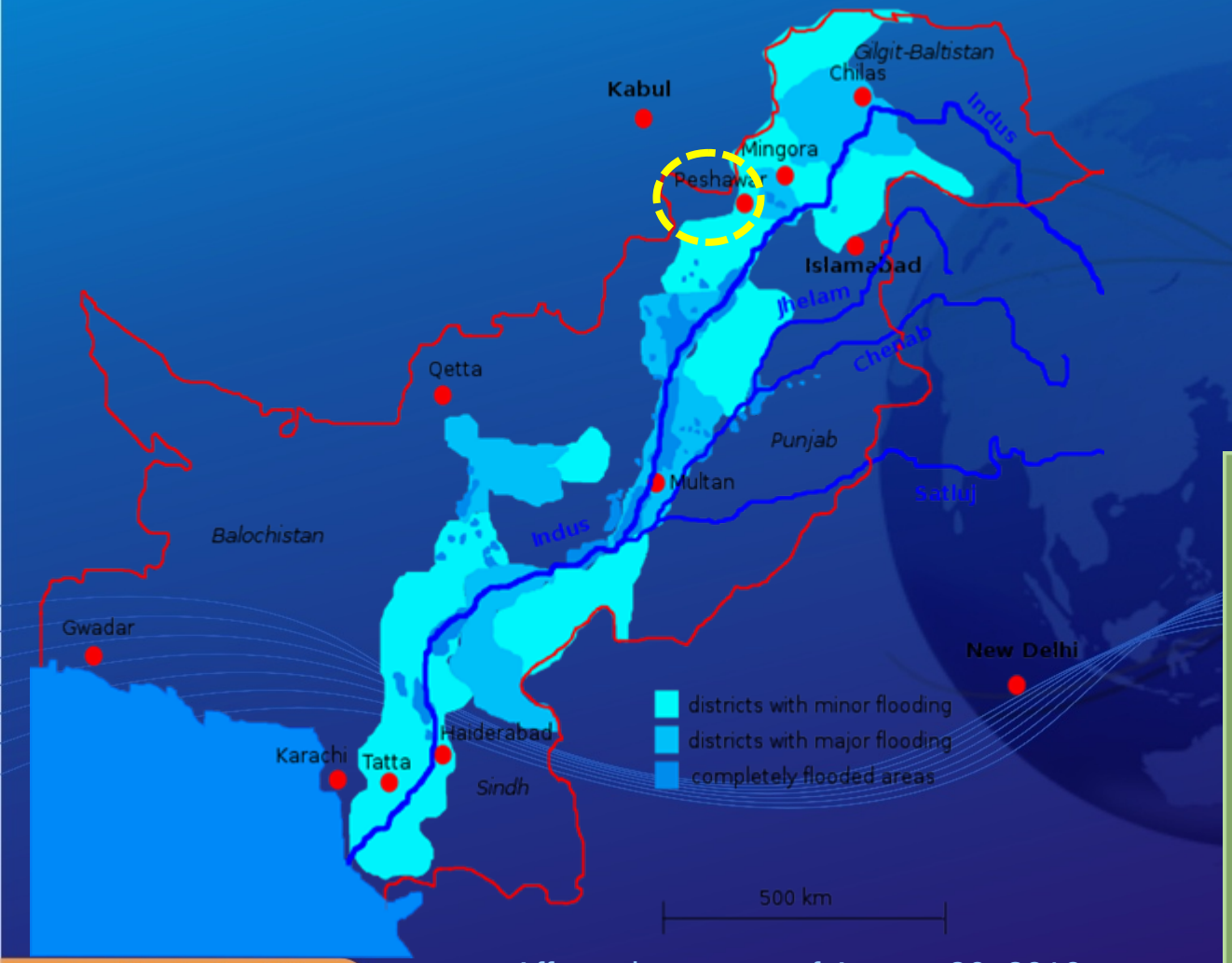
THEOS Image of 18th December 2009

Field test photo on 24th January 2010

THEOS Image of 18th January 2010

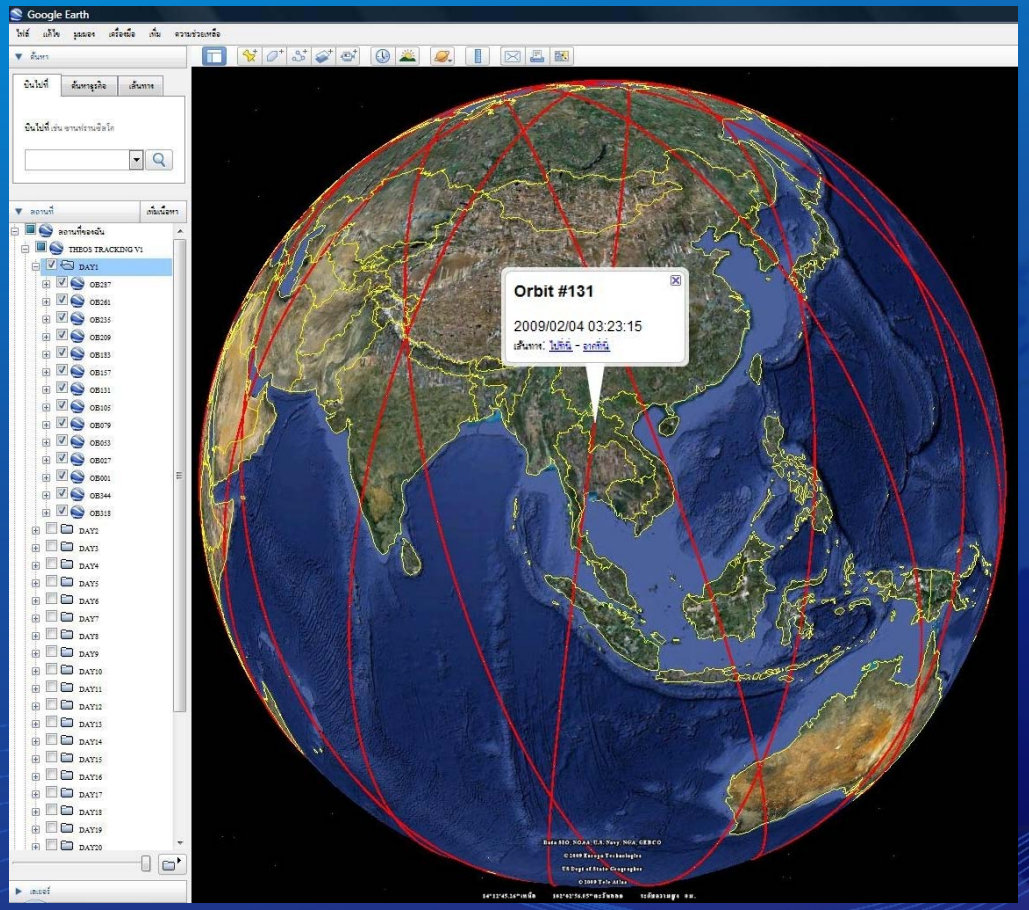
THEOS Programming – Event Based Collection (2010)

The 2010 Pakistan floods



Affected areas as of August 26, 2010

THEOS's orbit retrieving and display system



- Display both THEOS's orbit number and accessible areas
- Retrieves either the earliest date of the designated orbit number or the orbit number of designated date.
- provides THEOS's users with these data for more efficient request ordering.

Conclusion

- Training Program is our important role and one of them is GNSS Program.
- Training in GISTDA is not sufficient then we publish to 5 node universities
- Plan: Near Real Time data is available on Network between UniNet and GISTDA.
  - Training courses, learning tools download.
  - Satellite Imagery
- Apart from the benefits of universities, GISTDA also take this advantage to study requests for design next observation satellite for Thailand and control ground system in the future

THANK YOU

List of References:

1.R. Sachasiri. An Omni-directional Assessment of THEOS Operation Project.

2.A. RUNGSIPANICH. Using THEOS data in Assessment of paddy yield for agricultural product price insurance.

3.A. DETPON. Interconnection of THEOS data for research and education in Thailand

4.P.Apaphant, Natural Disaster Management Support System ASIAES Data Clearing House

5.S.Jaturat, THEOS's orbit retrieving and display system